Changes to the 2010 NBC for Radon Protection in Dwelling Units

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Changes to the 2010 NBC for Radon Protection in Dwelling Units

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Aussi disponible en français: Modifications apportées au CNB 2010 en vue de la protection contre le radon dans les maisons
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This article reviews changes in the 2010 National Building Code related to radon gas. The NBC provides specific protection against future radon ingress into conditioned spaces in Part 9 buildings.

The 2010 National Building Code has revised the requirements for protection from soil gas, including radon, intended to address the reduction in Health Canada's acceptable level of radon from 800 to 200 Bq/ m^3.

RADON

Radon is a colourless, odourless, radioactive gas that occurs naturally in the environment. Outdoors, its concentration is rendered negligible. But when it is emitted into an enclosed space, such as a building, it can accumulate to high levels and be a carcinogen. Radon can seep from the ground into buildings through cracks and unsealed penetrations in the floor and walls abutting the ground.

MEASURING RADON IN CANADIAN BUILDINGS

Although there are regions in Canada where high radon levels are known to occur, it cannot be concluded that, especially at the time of construction when code requirements are easiest to oversee, radon will not be a problem at other locations. First, a reliable and comprehensive radon map for Canada does not exist. Second, it is possible for high radon concentrations to be present in one building while neighbouring buildings might not have elevated concentrations. Last, it is very difficult to detect problematic radon concentrations during construction. Because mitigating high radon concentrations after construction is complete could be very expensive, providing provisional measures at the time of construction can increase safety and reduce the cost of future mitigation. This is the approach that was used for the 2010 code changes.

CHANGES TO THE 2010 NATIONAL BUILDING CODE FOR RADON

Protection from soil gas ingress is now required in all buildings. This protection is achieved by requiring a continuous air/soil gas barrier. The 2010 NBC provides specific protection against future radon ingress into conditioned spaces in Part 9 buildings by requiring one of the following two methods:

- The first method is fairly generic and requires a gas-permeable layer between the ground and the air barrier that allows for depressurization of the space below the soil gas barrier. This layer could be coarse sand or a dimpled membrane or another product that allows the collection and extraction of gas. An inlet needs to be provided that allows for effective depressurization of the gas-permeable layer. An outlet needs to be provided that permits connection to depressurization equipment sealed to maintain the integrity of the air barrier system. The outlet should be clearly labelled to indicate that it is intended for the removal of radon from below the floor-on-ground. An example of this method would be a sump chamber that is sealed to the air barrier, which can be connected and used to exhaust air from beneath a floor-on-ground.
- The second method is more specific and requires a 100-mm layer of clean, granular material under the floor on ground and a pipe at least 100 mm in diameter through the floor. The lower end of the pipe extends into the required granular layer. The top of the pipe must be fitted with an air-tight cap. If it is desired to locate the pipe rough-in close to an exterior wall or into the service area of a basement, normal plumbing pipe can be used to connect the vertical pipe to the center of the sub-floor. If the sub-floor space is interrupted by internal footings, it is important to ensure that the collection system is capable of depressurizing all areas. Possible configurations are shown in Figure 1.

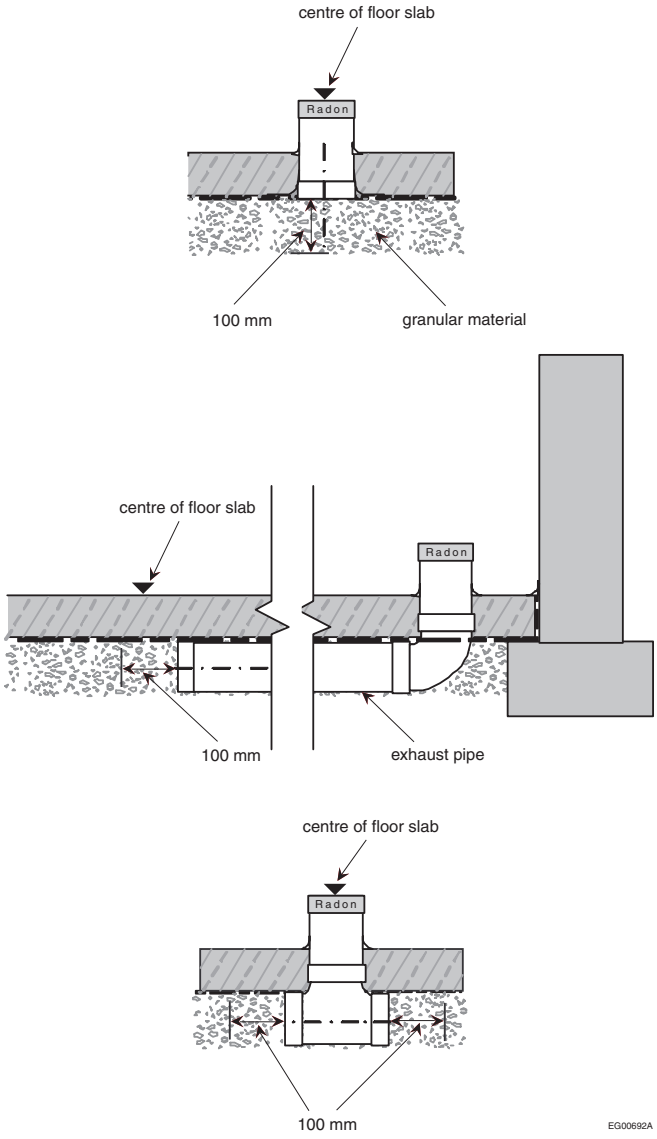

Figure 1. *Acceptable inlet/outlet configurations for the rough-in of a future depressurization system.*

Unheated (not conditioned) crawl spaces are not required to be protected against the ingress of radon because venting an unheated crawl space can be used as an effective radon mitigation system, should it become necessary. Heated crawl spaces are exempt from the requirement to provide a rough-in for a future radon extraction system if the crawl space does not have a concrete floor slab and if it remains accessible such that a person could easily install a connection to the sub-air barrier space to be used for the radon extraction system.

TESTING FOR RADON AND ACTIVATING THE DEPRESSURIZATION SYSTEM

Testing for radon after building occupancy has taken place is left to the building owner. If the results of the test indicate an annual average concentration exceeding 200 Bq/m3, the completion of the subfloor depressurization system may be necessary to reduce the radon concentration. Although not covered by code provisions, this requires that the rough-in pipe be uncapped and connected to a ventilation system exhausting to the outside. Two possible arrangements are shown in Figure 2.

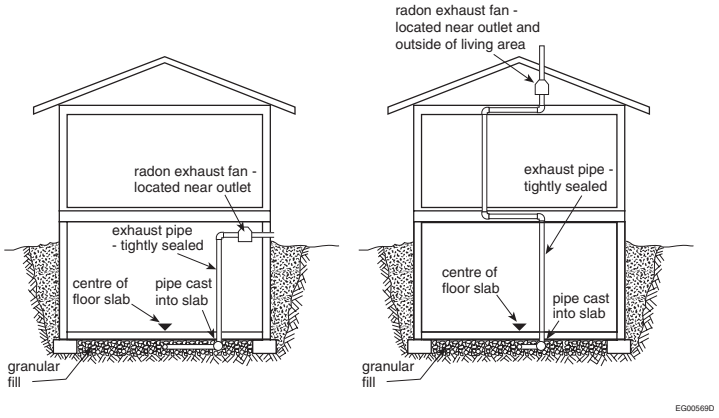

Figure 2. *Two types of sub-slab depressurization systems.*

The building should be retested for radon after completion and activation of a depressurization system. For further information on how to measure and remediate existing houses please refer to guides from CMHC and Health Canada: Radon: *A Guide for Canadian Homeowners; and Guide for Radon Measurements in Residential Dwellings (Homes).*

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